

Research Title:

Estimating the Safety Level of Urban Sites Based on the Analyses of Road-user Behaviours Using Automatically-generated Data: An Exploratory Study

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This study explored the application of data on dangerous behaviours of e-scooter riders that were generated by an advanced technology for conducting safety analyses. The main technology used for data collection was provided by the A.D Knight Company (ADK), with sensors performing real-time automatic detection of e-scooters based on detecting radio waves from connected devices. The study analyzed data collected by a pilot system established in the city of Ramat Gan, and focused on illegal e-scooter riding on pedestrian facilities. The study analyses intended for two purposes: 1) identification of risk sites - hours with high concentrations of e-rider violations; 2) examining the impact of a safety intervention - on-site presence of municipal inspectors, on e-rider behaviours. In each case, a methodology of formal analysis was developed, with fitting explanatory models for hourly violation frequency depending on day type, time period and site.

In the first analysis, significant differences were found in hourly violation profiles across days of the week, thus necessitating separate explanatory models for each day type. The analysis identified sub-groups of hours with higher concentrations of violations for each day type and site. The identified hours with high violation frequencies may support the selection of intervention hours to enhance enforcement efficiency on the field.

In the second analysis, a decreasing trend was found in violation frequency during hours with intervention activity compared to hours without intervention (but not significant). The average decrease in hourly violation rate, during the intervention hours, was 12%-13% at one site (Marom naveh) and 6%-10% at another site

(Rambam). The lack of significance in the results was expected given the limited number of intervention hours, at each site. Nevertheless, the consistent reduction trends in violation rates, during the intervention activity, indicated on the potential effectiveness of on-site enforcement.

Overall, the study demonstrated the applicability of the advanced technology (ADK sensors) for automatic generation of real-time data on illegal riding of e-scooters in pedestrian zones. The statistical methods developed in the study can be applied for planning safety interventions, monitoring over-time trends in e-rider behaviours, evaluating the impacts of interventions, or comparing the safety levels of different urban sites in terms of the extent of dangerous e-rider behaviours.